

**ABSTRACT**

A system for measuring a length of tape available for a record operation has both a tape  
5 supply reel which rotates as a tape leaves the supply reel during a tape transfer process,  
and a tape take-up reel which receives tape from the supply reel, and the tape take-up reel  
also rotates as it receives the tape during the tape transfer process. There are provided an  
encoder responsive to movement of the tape, a first angular position transducer to  
measure an angular position of the tape supply reel, a second angular position transducer  
10 to measure an angular position of the tape take-up reel, and a third transducer responsive  
to the encoder. A Kalman filter, responsive to an angular position measurement by the  
first angular position transducer, the second angular position transducer, and also the  
third angular position transducer, calculates the length of tape available for a record  
operation. The Kalman filter also calculates the radius of the tape pack on the supply  
15 reel, and the radius of the tape pack on the take-up reel.